United States
Environmental Protection
Agency

Office of Cooperative
Environmental Management
Washington, DC 20460

EPA-100-R-00-021
May 2000
www.epa.gov

EPA

Green Dividends?

The Relationship Between Firms' Environmental Performance and Financial Performance

Green Dividends?

The Relationship Between Firms' Environmental Performance and Financial Performance

Cover design and layout by Joseph L. Kolb, The Graphic Issue

U.S. Environmental Protection Agency

Office of the Administrator

Office of Cooperative Environmental Management

National Advisory Council for Environmental Policy and Technology

Green Dividends?

The Relationship between Firms' Environmental Performance and Financial Performance

A Report by the

Environmental Capital Markets Committee

The National Advisory Council for Environmental Policy and Technology is an independent Federal advisory committee that provides recommendations to the Administrator of the U.S. Environmental Protection Agency on a broad range of environmental issues. The Environmental Capital Markets Committee is an ad hoc committee of the Council and was formed to examine the nature of the relationship between a firm's environmental performance and its financial performance. The findings and recommendations of the Committee do not necessarily represent the views of the Environmental Protection Agency.

Contents

Executive Summary

A significant body of research shows a moderate positive correlation between a firm's environmental performance and its financial performance—regardless of the variables used to represent each kind of performance, the technique used to analyze the relationship, or the date of the study. However, capital markets have been slow to incorporate environmental information into mainstream investment decision-making.

The U.S. Environmental Protection Agency established the Environmental Capital Markets Committee to study the environment-finance connection. The Agency directed the Committee to (1) solicit the views of the financial services industry and others on the nature of this connection and (2) (if appropriate) identify concrete actions that the Agency might take, alone or in concert with other groups, to help the financial services industry enhance its own interests—and those of the environment—by acting on information about the environmental performance of firms. The Committee was composed of experts from publicly traded firms, financial firms, business schools, financial regulators, and environmental organizations.

The Committee decided to narrow its focus in two ways. First, it chose to concentrate its attention on equity investors rather than on fixed-income investors, commercial creditors, or insurers because equity investors can most profit from the financial gains of the firms in which they invest. It also chose to make mainstream equity investors, rather than socially responsible investors (who are also equity investors), its point of reference. Second, the Committee chose to concentrate its analysis and recommendations only on aspects of the environment-finance connection that EPA can influence.

With mainstream equity investors in mind, the Committee confronted three fundamental questions. First, does the existing body of research support the assertion that environmental performance has a material and positive effect on financial performance? Although the Committee found that a moderate positive correlation exists between environmental and financial performance, causation has yet to be determined. Moreover, this general correlation may be of little direct value to a financial analyst making an investment decision about a specific firm.

Second, why have equity investors not more fully incorporated environmental information into their investment selection processes? The Committee found a number of informational and institutional barriers to the incorporation of environmental information in financial analysis. "Environmental performance" is an umbrella term that has different connotations and no precise definition, and firms have not demonstrated clear links between current environmental strategies and future financial returns. Furthermore, environmental and financial analysts do not have common analytic frameworks or terminology, and separate regulatory regimes have tended to discourage their development.

Third, what, if anything, could—or should—EPA do to help private investors access and use environmental information in their investment selection processes?

The Committee made the following 11 recommendations to EPA:

1. Promote the creation of industry-specific environmental performance benchmarks, such as resource use and emissions.
2. Continue to provide technical assistance for ongoing efforts to standardize key aspects of corporate environmental disclosure.
3. Identify a single office to take responsibility for strategic planning of all EPA activities that relate to the financial services industry.
4. Give designated EPA personnel responsibility for targeting communications about the potential financial benefits of certain environmental strategies to the financial services industry, particularly equity investors and analysts, as well as to government agencies with financial regulatory responsibilities, such as the Department of the Treasury and the Securities and Exchange Commission.
5. Expand the range, as well as the accuracy and timeliness, of information that EPA currently makes available on firms' environmental performance.
6. Develop and maintain environmental outlook reports for each main industry group that highlight the major environmental trends and regulatory issues affecting each group.
7. Continue to promote firms' use of environmental accounting.
8. In collaboration with professional investment organizations, support development of equity valuation techniques that incorporate the financial consequences of environmental strategies.
9. Continue to promote market-oriented approaches to environmental protection and develop performance-based regulatory frameworks.
10. Discuss with the Department of Labor any possible changes in its policies that could give investors subject to its regulatory authority clear guidance that the financial implications of corporate environmental strategy are an appropriate investment consideration.
11. Maintain a dialogue with the Securities and Exchange Commission to promote changes in corporate disclosure that would give investors more relevant information about the environmental performance of companies.

Acknowledgments

In addition to the members of the Environmental Capital Markets Committee who were involved in the completion of this report, a number of people have contributed their time, talents, and expertise to its development.

Linda Descano served as liaison to the U.S. EPA's Environmental Financial Advisory Board while serving as a member of the Environmental Capital Markets Committee and brought depth and perspective to this project.

Invaluable insights into the evolution of the U.S. insurance industry's response to environmental trends were provided by Bob Irvan, former Senior Vice President and CFO of CIGNA Property & Casualty; Mike Miller, former Director of Governmental Affairs at CIGNA; and Erna Karrer-Rueedi, former Head of Research & Development at Swiss Reinsurance America.

Joe Cascio, former Vice President for Environmental Management Systems at the Global Environment and Technology Foundation, helped illuminate issues involving environmental policy-making and corporate environmental management.

Baxter International graciously provided data on its corporate environmental programs to the Committee. Ron Meissen, Senior Director of Engineering for Corporate Environmental, Health and Safety, and Verie Sandborg, Manager of Corporate Environmental, Health and Safety, spent many hours explaining and clarifying Baxter's approach to environmental management and the methodologies that Baxter employs to quantify the financial impacts of its environmental strategies.

Buddy Hay, Manager of Corporate Operations for Interface, Inc., provided information on Interface's environmental management systems that helped the Committee compare and contrast the approaches that different firms use to track the financial impact of their environmental initiatives.

Ed Weiler, Senior Economist with U.S. EPA's Office of Pollution Prevention and Toxics, was a key member of the management team that worked with the Committee to produce the report, and his dedication and keen insights were instrumental in its completion. Paula Van Lare, Senior Policy Analyst with EPA's Office of Reinvention and Policy, reviewed and critiqued several drafts of the report and wrote its executive summary.

John Ganzi, President of Environment & Finance Enterprise, executed much of the basic research that helped to inform the Committee's discussions and frame its work. Anne DeVries, Research Associate with Environment & Finance Enterprise, performed the literature and publications review that served as a resource for the Committee throughout its deliberations.

Don Reed, CFA, served as the principal author of this report.

Finally, this project would not have been possible without the support of Clarence Hardy, Director of the Office of Cooperative Environmental Management (OCEM), and Gordon Schisler, Deputy Director of OCEM. Gwen Whitt, the Designated Federal Officer for NACEPT, helped to present the report to the NACEPT Council for final review and approval.

Members of the Environmental Capital Markets Committee

Walter Howes
President
E.B.I. Capital Group, LLP
Washington, DC
Committee Chair

Robert Banks
V.P. for Health, Environment and Safety
Sunoco, Inc.
Philadelphia, Pennsylvania

Dorothy Bowers
V.P. for Environmental and Safety Policy
Merck & Co., Inc.
Whitehouse Station, New Jersey

Linda Descano
Director of Social Awareness Investment
SSB Citi Asset Management
New York, New York

Dianne Dillon-Ridgley
Member, Board of Directors
Interface, Inc.
Atlanta, Georgia

Ralph Earle III
The Assabet Group
Concord, Massachusetts

Virginia Gibbs
Senior Supervisory Financial Analyst
Division of Banking Supervision and Regulation
Board of Governors of the Federal Reserve
Washington, DC

Anna Huntington Kriska
Program Officer
First Nations Development Institute
Fredericksburg, Virginia

Eve Lesser
V.P., Investment Banking Division
Goldman, Sachs & Co.
New York, New York

Victor Miramontes
Managing Director and CEO
North American Development Bank
San Antonio, Texas

Franklin Nutter
President
Reinsurance Association of America
Washington, DC

Dennis Rondinelli
Director
Center for Global Business Research
University of North Carolina
Chapel Hill, North Carolina

Julie Tanner
Senior Financial Services Analyst
National Wildlife Federation
Washington, DC

Thomas Watson
National Bank Examiner
Officer of the Comptroller of the Currency
Washington, DC

Timothy Yessman
Senior Vice President
Travelers Property Casualty
Hartford, Connecticut

Mark Joyce
Senior Policy Advisor
Environment, Finance and Trade
U.S. Environmental Protection Agency
Designated Federal Officer

Introduction

The United States has made significant progress since the early 1970s in protecting the natural environment through laws and regulations. As the number and complexity of environmental regulations have increased, however, the limitations of exclusive reliance upon administrative fiat to ensure environmental protection have become apparent. Although regulations can prohibit obviously poor environmental practices (for example, discharge of raw waste into streams), they generally do not give industry incentives to address the root causes of pollution and to design cleaner processes and products.

Driven by a conviction that environmental pollution is nothing more than a manifestation of inefficiency, innovators within industry, government, and the environmental advocacy community have argued that sound environmental performance is part and parcel of good business practice and that a company's environmental strategies can materially improve its profitability. Despite its win-win appeal, this idea has yet to gain universal acceptance.

Given that regulatory agencies have neither the legal authority nor the capability to mandate efficiency, and hence to reduce pollution at the source, the U.S. Environmental Protection Agency (EPA) and other interested parties have attempted to identify private-sector allies whose own interests might be enhanced by improvements in industry's environmental performance. With the emergence of a significant body of research aimed at showing that improved environmental performance is associated with financial gain, their attention began to focus on the financial services industry. But the capital markets-driven revolution in environmental protection that had been envisioned by some (Schmidheiny and Zorraquin 1996; Korsvold 1997; and Chan-Fishel 1997) has not materialized, in part because of the difficulty of showing a direct relationship between firms' environmental performance and financial performance.

EPA established the Environmental Capital Markets Committee, an ad hoc Committee of its National Advisory Council for Environmental Policy and Technology, to study this relationship. In creating the Committee, the EPA selected individuals who represent various constituencies that theoretically have an interest in the environment-finance nexus—the financial services community, industry and industry associations, government, academia, and nongovernmental organizations. The Agency directed the Committee to (1) solicit the views of the financial services industry and other groups on the nature of the environment-finance connection and (2) (if appropriate) identify concrete actions that the Agency might take, alone or in concert with others, to help the financial services industry enhance its own interests—and those of the environment—by understanding and acting on information about the environmental performance of firms.

As a starting point for discussion, the Committee used "Corporate Environmental Performance as a Factor in Financial Industry Decisions," a background report and literature review prepared for the Agency. For reasons outlined in Chapter 1, the Committee chose to narrow its focus to the investment (and particularly the equity investment) sector of the financial services industry. With mainstream equity investors in mind, the Committee confronted three fundamental questions:

- Does the existing body of research generally support the assertion made by some that environmental performance has a material and positive effect on financial performance?
- If it does, why haven't investors more fully incorporated environmental performance into their investment selection processes?
- Given that private firms decide which environmental strategies to employ and that investors choose which securities to hold in their portfolios, what, if anything, could—or should—EPA do to influence these choices?

Chapter 1 of this report explores the ways in which environmental protection strategies potentially contribute to firms' equity valuation. It describes the evolution of thinking about the relationship between these strategies and overall business strategies in industry and the financial services community. In addition, the chapter presents the empirical case that academics, environmental advocates, and others have made for the materiality of environmental protection efforts to financial performance. Chapter 2 identifies barriers that can disconnect environmental performance from financial performance. Chapter 3 recommends actions that EPA can take to address these barriers.

CHAPTER 1
Materiality of Environmental Strategies to Improved Financial Performance

The environmental preferences of society, as revealed by environmental regulations and market choices, inevitably affect corporate financial performance, if only indirectly. Likewise, most environmental decisions by a firm have at least some impact on its financial condition. The idea that environmental performance might have a significant—in other words, material—effect on financial performance, however, is not widely accepted. Although this idea has been studied and discussed in environmental and socially responsible investment circles, it has been neither widely discussed nor widely reflected in the decisions of the mainstream financial community.

The Environmental Capital Markets Committee drew on the diverse expertise of its members to explore the environment-finance connection. It focused primarily on the financial services industry and explored how those involved in the three key financial functions of the industry—credit extensions, risk underwriting, and investing—deal with a range of corporate environmental issues.

To provide context for the Committee's recommendations in Chapter 3, this chapter briefly traces the evolution of how industry and the financial services community view the environment and the extent to which they deem environmental performance material to financial performance. In addition, the chapter presents the empirical case that academics, environmental advocates, and others have made for the financial materiality of environmental protection efforts.

Evolution of Industry's View of Environmental Issues

Until the latter half of this century, most industrial firms viewed the environment as a source of free inputs (for example, clean water) or as a free repository for wastes. Any resulting environmental damage was seen as the inevitable cost of economic progress. To the typical industrialist of this earlier era, environmental issues had little connection with financial performance. With the advent of Superfund's regime of strict liability and a host of prescriptive regulations, however, firms could ignore the environment only at their financial peril.

Industry, in general, reacted defensively to the new environmental costs. Eventually, however, many progressive firms developed strategies for minimizing these costs. More recently, a few firms have moved environmental protection from the cost side to the revenue side of the ledger. At the risk of over-simplifying the diversity of experiences among industries and specific companies, the evolution in industry's view of the environment can be described in terms of three discrete phases.

PHASE 1:
Minimization of Regulatory Compliance Costs

Initially, firms vigorously resisted new environmental protection requirements and sought to reverse existing ones. Once they realized that these requirements would be enforced, they viewed expenditures on meeting them as necessary to remain in business, but also as a drag on profitability and as otherwise unrelated to the

fulfillment of business objectives. These expenditures were to be minimized if they could not be avoided and were usually directed to treatment of effluents and emissions, a so-called "end-of-pipe solution" that was often mandated by prescriptive regulation.

PHASE 2:
Proactive Approaches to Environmental Management

Firms eventually began exploring less costly approaches to compliance. This effort led to the idea that industrial processes might be redesigned to prevent pollution—most often through the recovery and use or sale of materials and chemicals that previously were discarded as waste or emissions. Many firms have found this approach to be a relatively cheap way to comply with many emissions regulations as well as a way to improve operating margins through greater energy and materials efficiency. For example, through pollution prevention initiatives the diversified manufacturer 3M claims to have saved $810 million between 1975 and 1997 (3M 1998).

As part of this proactive approach to environmental compliance, firms began conducting internal environmental audits and implementing environmental management systems to understand and reduce their environmental impact in a more systematic way. They typically have used these and other monitoring and management tools to ensure regulatory compliance and to reduce the probability of incurring a major environmental liability—but they can also use these tools to go beyond compliance.

The proactive approach to environmental management was accompanied by a shift in attitude toward environmental regulation overall. Some segments of the business world began to advocate incentive-based environmental regulation, which would, they argued, allow firms flexibility to achieve environmental goals at less cost than command-and-control regulation.

As the proactive approach to environmental compliance has evolved, new concepts have emerged that have illuminated the financial implications of corporate environmental strategies. One framework for assessing environmental strategies is "eco-efficiency," which holds that redesign of production processes to reduce waste and environmental risk can improve operating margins, increase returns, and lower working capital expenses. DeSimone and Popoff (1997) identify seven objectives for an eco-efficient firm: (1) reduce material requirements of goods and services, (2) reduce energy inputs to goods and services, (3) reduce toxic dispersion, (4) maximize sustainable use of renewable resources, (5) enhance material recyclability, (6) extend product durability, and (7) increase the service intensity of goods and services. The first three objectives are becoming part of the generally accepted definition of good operations management in many manufacturing and basic industries. Implicit in this change is the notion that firms will go beyond compliance when doing so makes business sense—a strategy that has the added benefit of reducing risks associated with any new, stricter environmental requirements that might be promulgated in the future.

Several high-technology firms have extended their concept of environmental regulatory risk management from avoidance of environmental liabilities and accidents to reduction of the time needed to obtain environmental permits, thereby facilitating shortened product manufacturing cycles. Intel is well-known for taking this approach. Given that one generation of microprocessors is quickly succeeded by the next, Intel cares a great deal about its ability to bring its product to market as quickly as possible. Hence, it has gone beyond compliance in some areas to expedite permitting. In addition, it has integrated environmental concepts into its research and design functions with the same goal of rapid permitting of plants to fabricate computer chips (Resetar 1999).

PHASE 3: Creation of Value Through Environmental Strategies

Gradually, many firms have begun to view environmental strategies as a means to increase revenue through product innovation, market redefinition, and the creation of barriers to market entry by firms with lesser environmental management capabilities.

Product innovation

Product innovation can take many forms, including design of products to be reused or recycled, reduction of toxic materials used in products, reduction of the environmental impact of a product's use, and increase of a product's energy efficiency. Electrolux has taken the last approach with many of its home appliances. At Electrolux, products with the best environmental records earn higher margins, accounting for 5 percent of the firm's sales but 8 percent of its gross margins (Arnold and Day 1998).

Market redefinition

A few firms have redefined their markets on the basis of environmental business opportunities. This strategy often involves expansion of a firm's activities from production of a product to provision of the service for which the product is purchased—for example, shifting from the production of paint to the painting of cars. The incentives will change dramatically for a paint manufacturer that defines its business in terms of—and that is paid by—the number of cars painted rather than the volume of paint sold. The manufacturer will now find less use of paint preferable, leading to less waste and less environmental impact (Arnold and Day 1998).

Creation of barriers to market entry

Some firms have used environmental strategies as a barrier to market entry by other firms, thereby increasing their own market share. One example of this strategy is DuPont's development of alternatives to chlorinated fluorocarbons (CFCs) in refrigeration applications. Although DuPont was a leading manufacturer of CFCs, it had developed some of the best alternative refrigerants and stood to gain more than it lost relative to its competitors by phasing out the use of CFCs and introducing substitute products in accordance with the Montreal Protocol (Reinhardt 1989).

Evolution of the Financial Services Industry's View of Environmental Issues

The financial services industry's views on environmental issues have evolved in response to events that have created specific risk exposures. These views vary from one sector of the industry to another.

Commercial Creditors

A creditor's primary interest is in those strategies that reduce its clients' risk of business interruptions or shutdowns, legal liabilities, and regulatory compliance penalties. The current perspective of commercial creditors on environmental issues owes primarily to passage in 1980 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), more commonly known as Superfund. Superfund

created strict legal liability for the cleanup of sites contaminated as a result of the past actions of the parties held responsible. In some cases, that liability was financially significant. Probst and Portney (1992) estimate that the total cost of remedial action at Superfund sites is $44 billion. The Congressional Budget Office (1994) suggests that the cost could reach $75 billion or more.

Superfund became a salient issue for commercial creditors in 1990, when a court found Fleet Financial, through its subsidiary Fleet Factors, liable for Superfund cleanup costs at a facility that Fleet acquired when it foreclosed on a client. The court determined that Fleet had the potential to alter the operating practices of its client and was thus liable for contamination at the facility (Ganzi and Devries 1998). Although subsequent regulatory and congressional actions have to some extent clarified the secured creditor exemption provision in the Superfund law, creditors continue to face some uncertainty with regard to their potential liability.

In response, creditors have developed due diligence procedures to minimize risks associated with acceptance of potentially contaminated real estate as collateral for credits. These risks include the possibility that the creditor might be held liable for the cost of cleaning up the property, that the value of the property might appreciably decrease as a result of environmental problems, and that these problems might inhibit the creditor's ability to economically take possession of the property.

Insurers

In the mid-1970s, the property and casualty insurance industry faced claims for worker injuries resulting from releases of asbestos at plants where the substance was used in the manufacturing process. In the early 1980s, insurers also received claims resulting from Superfund's provision of strict liability for cleanup costs. According to representatives of the insurance industry, the general commercial liability policies under which these claims were brought were never intended to cover the cost of "expected or intended" contamination; rather, the policies were intended to cover the costs of accidents. But court rulings in various jurisdictions that held the insurers responsible for paying the claims led the industry to develop and adopt pollution exclusion clauses in these policies. By 1985, these "absolute" pollution exclusion clauses became part of virtually all commercial general liability policies written by the industry. In recent years, however, a few insurers have offered environmental impairment liability insurance policies that are limited in scope (Ganzi and DeVries 1998).

Like creditors, insurers have developed the capability to evaluate specific environmental risks associated with the financial service that they provide to firms. They believe that the potential for certain environmental strategies to improve financial performance is not material to risk underwriting. Moreover, they argue that environmental issues are not material to policies underwritten in the United States since 1985 because of the exclusion clauses noted above.

Equity Investors

In both commercial credit extensions and property and casualty insurance, the use of information about environmental performance is limited to very specific situations but is undertaken by many, if not all, mainstream institutions in the field. In general, no analogous situation exists in equity investment, in which understanding of environmental issues varies considerably, depending on the industry in question. Investors

may pay attention to environmental issues in mining and other resource extraction industries in which these issues have historically been important, but they do not generally understand how the environmental decisions of a firm affect its product offerings, efficiency, markets, and future outlook for revenues and earnings.

In financial analysis, perception is an important part of reality. The traditional perception of equity investment analysts is that if environmental strategies matter at all in a firm's financial performance, they do so in terms of liabilities and risks. In the view of these analysts, *environmental liabilities* are primarily associated with Superfund and lend themselves to quantification; *environmental risks* are primarily associated with catastrophic accidents, such as the oil spill from the *Exxon Valdez* in Prince William Sound and the chemical release from the Union Carbide plant in Bhopal, India, and are sufficiently rare as to be a minor consideration. This perception is confirmed by several studies (Ganzi and Dunn 1995; Ganzi and Tanner 1997; Gentry and Fernandez 1997; PricewaterhouseCoopers 1999).

Virtually none of the valuation techniques used by equity analysts explicitly address environmental strategies, yet equity investors have a stake in the potential of these strategies to reduce risks and increase margins, revenues, earnings, and returns on invested capital. Although equity investors tend to think that environmental protection has potentially negative consequences for firms, some financial analysts may be reconsidering their view of environmental performance. For example, the Merrill Lynch sell-side financial analysts who follow the carpet manufacturer Interface report that the company's program to reduce emissions, materials use, and energy use could be a significant source of value through its impact on operating margins (Singleton and Elia 1998).

Analyses of corporate environmental performance conducted by the socially responsible investment community provide a useful contrast to mainstream equity analysis. These analyses have largely been confined to evaluation of environmental performance without reference to financial performance, and they do not typically attempt to directly relate environmental protection strategies to the business strategies of the firms studied. In general, socially responsible investors have used non-financial criteria to eliminate certain stocks from the universe of potential investments. They then apply conventional financial analysis to the remaining stocks.

However, some socially responsible investors and other asset managers have begun using environmental performance as a positive selection criterion in their financial analysis. One approach is to incorporate information about environmental performance in active stock-picking techniques. This "best-in-class" approach is taken by Smith Barney Asset Management's Social Awareness Investment Program and several European eco-efficiency funds.

A second approach is to apply a quantitative analysis of environmental performance to passive investing, or indexing. Under this approach, asset managers over-weight the stocks of environmental best-in-class companies in a portfolio that is designed to track a conventional index. This approach is taken by the Dow Jones Sustainability Group Indexes and the Eco-enhanced Index Management offered by Dreyfus Investment Advisors and Mellon Capital Management.

Despite the emergence of efforts to use environmental performance as a positive selection criterion in equity investing, most investors remain skeptical about the value of understanding corporate environmental performance. Moreover, those investors who have decided that understanding such performance might be worthwhile are still attempting to determine the most appropriate techniques for integrating environmental performance into their financial analysis.

Empirical Evidence

A significant body of academic research relates measures of corporate environmental performance to measures of financial performance. The most striking aspect of this research is that most of it shows a moderate positive relationship between the two kinds of performance—regardless of the variables used to represent each kind of performance, the technique used to analyze the relationship, or the date of the study. In fact, the empirical evidence is of sufficient consistency and scale to embolden some to argue that a positive relationship between environmental performance and financial performance is without doubt (Kiernan 1998).

Yet studies of this relationship do not answer the questions that are of greatest importance to many investors. Reed (1998) catalogs the main criticisms of these studies as follows:

- Most of the studies are not industry-specific. Most analysts who believe that environmental strategies can add value to firms think that the degree to which this is true varies from one industry to another.
- Almost all the studies depend on narrow sets of backward-looking data with significant quality problems.
- Virtually none of the studies attempt to assess how well firms are positioned to deal with environmental opportunities and challenges in the future.
- Virtually none of the studies address the key question of how an understanding of environmental strategies could change financial analysts' valuation of firms.
- Among the studies that compare the performance of portfolios of stocks in environmental leaders with the performance of portfolios of stocks in environmental laggards, virtually none correct for differences in risk other than differences in environmental performance.
- Virtually none of the studies address causation.

The last criticism requires further examination. Three theories have emerged that attempt to explain the causal link between environmental and financial performance. First, firms that are profitable might be more willing to spend money on environmental protection than those that are less financially successful. Second, the process of pursuing better environmental performance may lead to improved financial performance. And third, firms that have better environmental performance may generally be well-managed. According to this theory, the high-quality management indicated by good environmental performance leads to improved financial performance. None of these theories have been proven or refuted. Moreover, all or none of the three might be true.

Causation may not be particularly important for practitioners of certain quantitative equity investment methods that rely on correlation without reference to causation. These practitioners seek to exploit the statistical correlation between environmental performance and financial performance and are not concerned with proving causality. In addition, if the relationship between environmental performance and financial performance is more complicated than one of these variables triggering a change in the other, causality may be impossible to determine.

Overall, the empirical evidence appears to lay to rest the argument that the investments required to achieve sound environmental performance are a net drag on financial performance; rather, it suggests that a positive relationship between the two kinds of performance is likely. This broad finding may be of little direct value to a financial analyst making an equity investment decision about a specific firm. However, the fact that the relationship is positive suggests that it could be valuable to analysts if it were better understood.

CHAPTER 2
Barriers to Integrating the Value of Environmental Strategies into Financial Analysis

The case that the environmental performance of firms has a material bearing on their financial performance is incomplete but sufficiently promising to raise the question of why the financial implications of environmental strategies are not better reflected in financial analysis. The Environmental Capital Markets Committee concluded that many barriers have prevented most firms and equity investors from exploiting the potential to profit from understanding the relationship between environmental strategies and financial performance.

One set of barriers derives from the basic set of property rights and economic rules that enable some firms to pay less than the full economic costs associated with their actions. These barriers broadly relate to who bears the cost of pollution and environmental degradation and to how the tax system affects the market price and use of natural resources. In the absence of these barriers, firms would have a greater incentive to explore the use of environmental protection measures that could potentially increase their current and future value. In general, EPA has little legal authority to diminish these barriers. However, EPA could play an important role in helping to address another set of barriers that relates to (1) the difficulties of understanding the concepts of environmental performance and strategies and applying these concepts to financial analysis and (2) the uncertainties posed by environmental and financial regulatory systems. This chapter addresses both sets of barriers.

Barriers Beyond EPA's Legal Authority to Address

Not all the laws and regulations that have an impact on the environment are environmental in nature. The non-environmental rules governing business are a key determinant of the ways in which firms deal with the environment and the extent to which their environmental strategies affect their financial performance. Although these "rules of the game" are beyond the scope of EPA's authority to address, the issues of who pays the cost of pollution and how tax policy affects the environment are so significant that the present discussion would be incomplete without mention of them.

Under current business laws and regulations, firms in many instances are not required to bear the full cost of their use of natural resources or the cost of the environmental damage that they cause. Hence the prices of goods and services often do not reflect their "true" economic costs. These costs that are unaccounted for are called externalities because they are "external" to the firm. (Environmental regulations and findings of liability in this country have increasingly required firms to internalize some of these external costs, a trend that is likely to continue in the future.) If firms were responsible for a greater portion of their externalities, their competitive advantage would be affected. For example, if the cost of energy was raised to reflect the cost to society of the pollution resulting from energy production and use, those firms that had already developed the capability to use energy more efficiently would realize a competitive advantage, and equity investors would profit from their ability to identify them.

Tax policies also play a large role in determining the market prices and level of use of most natural resources. These policies can introduce distortions in the pricing of natural resources that encourage production from virgin resources and discourage the use of recycled or secondary materials (Kinsella et al. 1999). Obviously, changes in tax policy that increase the costs of a natural resource could increase any advantage that a firm might obtain by using less of that resource in its operations.

Barriers That EPA Can Help to Diminish

EPA can help to address five barriers to integrating the value of environmental strategies into financial analysis. Three barriers relate to the inherent difficulties of understanding the concepts of environmental performance and strategies and applying them to such analysis. Two other barriers are created by environmental and financial regulatory systems.

Barriers to Understanding the Concepts of Environmental Performance and Strategies and Applying Them to Financial Analysis

Understanding of the concepts of environmental performance and strategies and application of them to financial analysis are impeded by imprecise terminology for describing environmental performance, lack of information exchange and a common language for describing environmental strategies, and lack of technical skills to relate such strategies to financial performance.

Imprecise terminology for describing environmental performance

Environmental performance is an umbrella term for a variety of parameters that vary considerably from one situation to another and from one observer to another. Evaluation of such performance is exceedingly difficult, even with respect to the simplest single-product firm. For example, how does one reasonably think about the environmental performance of such a firm if its toxic emissions are the lowest in the industry, but its intensity of energy and materials use is high compared with that of its peers? If environmental performance cannot be defined fairly precisely, it cannot be measured rigorously. If such performance cannot be measured rigorously, its relationship to financial performance will remain difficult to demonstrate convincingly. Finally, if such performance is not defined with reference to the operational objectives of individual firms and specific industries, it will not be relevant to managers and investors.

A study for the European Environment Commission identified no less than 33 systems for rating environmental performance (Skillius and Wennberg 1998). The existence of so many of these systems and the wide disparity in the metrics used in corporate environmental reports manifest the lack of consensus on the definition of environmental performance. However, the many rating systems and metrics could merely reflect the nascent state of environmental performance measurement. If so, greater consensus on the definition could eventually emerge.

Because consensus on the definition of environmental performance is lacking, the type of data that should be used to measure that performance is unclear. In a practical sense, the distinction between the definition and the data is moot because to date the data have been used to define the performance. Efforts to forge consensus on the data that firms should collect and on the way that these data should be reported remain in the development stage (Ranganathan 1998). The environmental performance data that are available

from both centralized sources and directly from firms varies in quality and completeness and were not developed to meet the needs of financial analysts. Because no recognized standard exists for the gathering of these data, they are not comparable.

On the other hand, there is no universal agreement that a precise definition of environmental performance is needed. Descano and Gentry (1998) point out that financial analysts are more likely to find value in information about how the environmental strategy of a firm relates to its overall business strategy than in data on emissions, waste, and efficiency. The argument, although not confirmed by empirical research, is supported by the fact that financial analysis focuses on overall business strategies rather than on collections of technical details. Although the financial services industry has not articulated what, if any, environmental performance information it wants, it has indicated that only industry-specific information—that is, information that allows comparisons within, not across, industries—would be useful for its purposes. Analysts could use this information on the basis of when and how it is material to the financial performance of the companies in a given industry.

Lack of information exchange and a common language for describing environmental strategies

The equity investment community is generally unconvinced that it is worth its time and effort to understand the present and future value that firms realize through their environmental strategies. One reason may be that financial analysts have not been given evidence of such value—that is, they have not been given industry-specific environmental analyses and firm-specific environmental data related to established drivers of corporate value. Only a few firms that believe that their environmental strategies increase shareholder value have made that claim to financial analysts, and few have offered any sort of financial information to support such a claim.

Underlying this lack of information exchange is another, more fundamental problem. Financial analysts (both those in firms and in the financial services industry), environmental managers in firms, and environmental advocates have different professional lexicons and have different points of reference. However, several groups, including the Aspen Institute (1999) and the Environmental Capital Markets Committee, have undertaken a series of meetings to discuss this problem. In addition, the New York Society of Security Analysts and the Boston Security Analysts Society have sponsored a series of presentations in which firms, financial analysts, and advocacy organizations addressed the financial importance of environmental strategies.

Lack of technical skills to understand how environmental strategies affect financial outcomes

A survey by the United Nations Environment Programme (UNEP) Financial Institutions Initiative on the Environment indicated that the lack of means to translate environmental issues into financial terms was the greatest single barrier to integrating information about environmental strategies into financial analysis (PricewaterhouseCoopers 1999). This lack of technical skills is compounded by the industry-by-industry variance in the importance and nature of the relationship between financial performance and environmental performance, limiting the ability of financial analysts who work for companies to articulate the value of those companies' environmental strategies. Within firms, few people are experienced with environmental and full-cost accounting, which enables managers to measure total environmental costs. Within the financial services industry, existing security valuation methodologies do not easily accommodate consideration of that portion of corporate value that is attributable to environmental strategies.

Barriers Erected by Environmental and Financial Regulatory Systems

Environmental and financial regulatory systems have inadvertently erected two barriers to integration of the value of environmental strategies in financial analysis. One barrier is a lack of market mechanisms to encourage implementation of environmental strategies that might increase the value of firms. The other is impediments to consideration of a firm's environmental strategies in the making of investment decisions.

Lack of market mechanisms to encourage environmental strategies that might increase the value of firms

The existing environmental regulatory system generally is focused on promulgating and enforcing emissions standards and makes little use of market mechanisms that would provide economic incentives to improve environmental performance beyond that required for regulatory compliance. In the environmental regulation arena, there has been much discussion about incentive systems, such as emissions permit trading, and their potential benefits to both environmental quality and the financial performance of firms. However, with the notable exception of sulfur dioxide permit trading, which is generally perceived to have been of both environmental and financial benefit, the incentives adopted in the United States have had only marginal environmental or economic benefit (Beardsley 1997) and their cost-effectiveness is uncertain (Muir and Forbes 1999).

Impediments to consideration of a firm's environmental strategies in the making of investment decisions

The rules defining the fiduciary responsibility of many institutional investors are easily construed to prevent consideration of all but traditional financial factors in the selection of firms for inclusion in investment portfolios. Although these rules do not explicitly state that investors should ignore environmental strategies, they have been interpreted to express exactly that (Reed 1998). This interpretation is consistent with fiduciaries' generally conservative nature, which has made them relatively slow to adopt a variety of investment strategies that other investors considered standard practice long before legal fiduciaries used them.

In a May 28, 1998 opinion letter, the Department of Labor (DOL) has given pension plans comfort that they may offer socially responsible investment alternatives under certain conditions. The letter makes it clear that regulated pension plans under DOL's authority may screen out particular classes of companies, but it does not address the question of whether these plans may consider environmental strategies in their selection of the best possible investments.

Even if investors did wish to consider such strategies, they would have difficulty doing so because Securities and Exchange Commission (SEC) rules have not encouraged firms to disclose information about their environmental performance. The basic principle of public disclosure is that companies should reveal information that is material to investors. Therefore, if the environmental matters of a given company are material to the company's financial performance, they should be disclosed. The SEC has proposed extensive rules to address the broad issue of corporate disclosure for investors and has provided guidance on what constitutes "materiality" that does not reference environmental issues.

CHAPTER 3
Recommendations

The Environmental Capital Markets Committee began its deliberations with a broad directive, allowing it to pursue its work along many paths. Through research and discussion, the Committee made two key decisions that eventually narrowed its analysis. First, the Committee chose to focus its analysis, and hence its recommendations, on the potential benefits that equity investors could realize from a keener appreciation of the connections between corporate environmental considerations and financial performance. Second, the Committee chose not to address aspects of the relationship between corporate environmental performance and financial performance that are governed by the broad economic "rules of the game" referred to in Chapter 2 and that therefore generally fall outside of EPA's authority.

The Committee concluded that environmental strategies increasingly have the potential to benefit firms financially and, therefore, equity investors. But it also concluded that certain barriers make leveraging of the relationship between environmental performance and financial performance difficult. Recommendations that should help remove these barriers are described below.

Imprecise Terminology for Describing Environmental Performance

To address the problem of imprecise terminology for describing environmental performance, the Committee makes two recommendations to EPA.

RECOMMENDATION 1:

Promote the creation of industry-specific environmental performance benchmarks, such as resource use and emissions.

Benchmarks would be particularly useful to those investors who believe that they can better understand the connection between financial performance and environmental performance by understanding the latter in operational terms. Just as these investors need industry-specific financial ratios to make comparisons among firms within a given industry, so too they need industry-specific environmental performance benchmarks that reflect environmental trends and regulatory trends and that lend themselves to incorporation in financial measures. EPA could support development of meaningful benchmarks in collaboration with investors, companies, industry associations, and other stakeholders. The benchmarks should complement the environmental outlook reports described in Recommendation 6.

RECOMMENDATION 2:

Continue to provide technical assistance for ongoing efforts to standardize key aspects of corporate environmental disclosure.

Lack of uniformity in disclosure of environmental performance precludes effective comparisons of such performance among firms by investors. Moreover, without greater standardization of such disclosure, firms will find comparison of their own environmental performance with that of other firms difficult. Therefore, EPA should provide technical assistance to current efforts to standardize key aspects of corporate environmental disclosure. These efforts include the Global Reporting Initiative of the Coalition for Environmentally Responsible Economies (CERES) and the work of the World Business Council on Sustainable Development's Task Force on eco-efficiency metrics.

Lack of Information Exchange and a Common Language for Describing Environmental Strategies

The Committee makes four recommendations to EPA to promote information exchange and a common language for describing environmental strategies.

RECOMMENDATION 3:

Identify a single office to take responsibility for strategic planning of all EPA activities that relate to the financial services industry.

At present, EPA is engaged in a variety of activities that relate to the financial services industry. For example, the Agency has promoted the use of environmental accounting and provided funding for research on the relationship between environmental performance and financial performance. More recently, those responsible for EPA's programs to promote energy efficiency have begun working with equity investment analysts to develop the argument that investors should care about the energy use of firms in certain industries. The impact of these and similar efforts would be greater if a single body—such as the office that supports the Environmental Financial Advisory Board—were responsible for the strategic planning of all Agency activities that relate to the financial services industry. EPA should consider expansion of the authority and resources of an office to carry out this mandate and to implement the other recommendations made in this report.

RECOMMENDATION 4:

Give designated EPA personnel responsibility for targeting communications about the potential financial benefits of certain environmental strategies to the financial services industry, particularly equity investors and analysts, as well as to government agencies with financial regulatory responsibilities, such as the Department of the Treasury and the Securities and Exchange Commission.

The financial value of environmental strategies must be communicated to equity investors and others in the financial services industry. To this end, EPA should work with other government agencies and with representatives of each segment of the industry to convene workshops, meetings, and other forums to convey relevant information. These events should highlight relevant research and the actual experience of

firms that have financially benefited from environmental strategies. Moreover, designated EPA personnel should be given responsibility for fielding requests for information from investors and from government agencies with financial regulatory responsibilities.

RECOMMENDATION 5:

Expand the range as well as the accuracy and timeliness of information that EPA currently makes available on firms' environmental performance.

As EPA reorganizes its information management programs and develops its Office of Environmental Information, it should identify the financial services industry as a constituency to serve. The Agency should ask this industry what information it wants and would use. EPA's Web site should provide comprehensive information on firms' environmental performance, and the Agency should develop other mechanisms for making relevant environmental information accessible to investors.

RECOMMENDATION 6:

Develop and maintain environmental outlook reports for each main industry group that highlight the major environmental trends and regulatory issues affecting each group.

This recommendation derives from two conclusions of the Committee. First, many investors are primarily interested in the broad trends and issues that affect the future value of the firms in which they are considering investment. Second, the importance of and the particular way in which environmental trends and regulatory issues relate to financial performance vary considerably by industry. For example, one of the keys to financial success in commodities industries is low-cost production. Therefore, the environmental strategy that is most immediately relevant in commodities businesses typically relates to efficiency and the increase of margins. For consumer products, however, product differentiation is paramount. Therefore, an environmental strategy that involves product innovation would be particularly important to consumer products firms.

Lack of Technical Skills to Understand How Environmental Strategies Affect Financial Outcomes

To improve technical skills necessary to understand how environmental strategies affect financial outcomes, the Committee makes two recommendations to EPA.

RECOMMENDATION 7:

Continue to promote firms' use of environmental accounting.

Environmental accounting can aid firms in explaining the financial significance of their environmental efforts to equity investors and can help firms better assess the financial impact of their environmental management decisions. In addition, environmental accounting is important to successful implementation of the technical assistance efforts to standardize corporate environmental disclosure that are identified in the discussion under Recommendation 2. In promoting the use of environmental accounting, EPA's Environmental Accounting Project should seek greater input from the equity investment community.

RECOMMENDATION 8:

In collaboration with professional investment organizations, support development of equity valuation techniques that incorporate the financial consequences of environmental strategies.

EPA already funds outside research on the linkage of financial performance and environmental performance. It should extend its support to efforts that relate environmental strategies to research in the general field of security valuation—specifically, research that addresses valuation of competitive advantages and intangible assets, such as research and development. It also should support the development of models that would help assess the effect of future environmental regulations on firms employing different environmental strategies in the same market. This research should focus on application of valuation techniques (as opposed to theoretical work) and should involve professional investment organizations.

Lack of Market Mechanisms to Promote Environmental Strategies That Might Increase the Value of Firms

To promote environmental strategies that might increase the value of firms, the Committee makes one recommendation to EPA.

RECOMMENDATION 9:

Continue to promote market-oriented approaches to environmental protection and develop performance-based regulatory frameworks.

Incentive systems can provide financial benefits to firms whose efforts go well beyond minimal environmental compliance—benefits that financial analysts can take into consideration in decisions about equity investments. Perhaps the best-known incentive system is emissions permit trading. The United States has the greatest body of experience with trading of sulfur dioxide emissions permits. At present, EPA is exploring use of permit trading in efforts to control nitrogen oxide emissions in the eastern United States.

Regulatory schemes that provide regulatory flexibility in exchange for the meeting of high, voluntary standards of environmental performance, such as the European Union's Eco-Management Audit Scheme (EMAS), can yield financial benefits. Under these schemes, firms whose environmental performance in one area is better than that required by law are given flexibility in meeting regulatory standards for environmental protection in other areas, as long as such flexibility is consistent with the achievement of a net environmental benefit and does not substantively sacrifice environmental protection on any one front.

Impediments to Consideration of a Firm's Environmental Strategies in the Making of Investment Decisions

To encourage consideration of environmental strategies in the selection of firms for inclusion in investment portfolios, the Committee makes two recommendations to EPA.

RECOMMENDATION 10:

Discuss with the Department of Labor any possible changes in its policies that could give investors subject to its regulatory authority clear guidance that the financial implications of corporate environmental strategy are an appropriate investment consideration.

The Department of Labor (DOL) guides investment of immense amounts of capital in its capacity as regulator of many pension funds. DOL rules defining fiduciary responsibility can be interpreted to preclude consideration of all but traditional financial considerations. As noted in Chapter 2, a recent DOL opinion letter assures pension plan sponsors that under specific conditions they may offer socially responsible investment options in defined contribution plans. However, the letter offers no guidance concerning the appropriateness of using environmental strategies as a criterion in the selection of firms for investment.

RECOMMENDATION 11:

Maintain a dialogue with the Securities and Exchange Commission to promote changes in corporate disclosure that would give investors more relevant information about the environmental performance of companies.

The Securities and Exchange Commission (SEC) prescribes the framework governing financial disclosure by publicly traded firms. In Staff Accounting Bulletin (SAB) 99, the SEC made it clear that there is no threshold, or "bright line," for determination of materiality. Instead, it recommends that a number of factors be considered in making this determination. EPA should work with the SEC and other parties to develop guidance for companies with respect to application of the principles of SAB 99 in the context of environmental performance, and the EPA-SEC Working Group should assist in this effort.

Conclusions

The Committee believes that the adage "capital follows, it doesn't lead" aptly summarizes the reason why the financial services industry will not exert overt pressure to demand better environmental performance by its corporate clients. When leading firms in many sectors can quantitatively demonstrate that their environmental strategies have made significant contributions to their operating margins and net profits, they will be rewarded by the financial markets, and pressure will build for environmental laggards to improve.

The challenges of identifying any "hidden value" in a firm's environmental strategies are similar to the difficulties of identifying the marginal value in a firm's information strategies. Although many firms have come to view their information management strategies as an integral part of their comprehensive strategic business plans, valuing a company's information assets and the competitive advantage that its information strategies might yield is still a very uncertain science. So too is valuing a firm's environmental strategies and performance.

And even though most mainstream members of the financial services industry currently feel that a firm's environmental strategies are a minor consideration at best, and that they are overshadowed by other value-drivers, environmental issues will continue to grow in importance. Moreover, as competition in the global marketplace intensifies, both individual firms and the financial analysts that deal with them will be pressed to maintain profitability; developing the tools and methodologies to identify and capitalize on environmental trends will likely be one way to do so.

Although EPA's role in these efforts may be limited, it is nevertheless important. By concentrating its resources on enhancing the utility of the information that it provides, EPA will contribute to greater efficiency in financial markets, which will ultimately benefit investors, progressive companies, and the environment.

References

3M. 1998. *3M Pollution Prevention Pays: Moving Toward Environmental Sustainability*. St. Paul, Minnesota: 3M.

Arnold, Matthew, and Robert Day. 1998. *The Next Bottom Line: Making Sustainable Development Tangible.* Washington, DC: World Resources Institute.

Aspen Institute. 1999. *Uncovering Value: Integrating Environmental and Financial Performance.* Washington, DC: Aspen Institute.

Beardsley, Daniel. 1997. *Incentives for Environmental Improvement: An Assessment of Selected Innovative Programs in the United States and Europe.* Washington, DC: Global Environmental Management Initiative.

Chan-Fishel, Michelle. 1998. *Risk Exposure: Revealing Environmental Risks to Financiers.* Washington, DC: Friends of the Earth.

Congressional Budget Office. *The Total Costs of Cleaning Up Nonfederal Superfund Sites.* Washington, DC: The Congress of the United States, Congressional Budget Office.

Descano, Linda, and Bradford Gentry. 1998. Communicating Environmental Performance to the Capital Markets. *Corporate Environmental Strategy*. Spring 1998: 14–19.

DeSimone, Livio D., and Frank Popoff with The World Business Council for Sustainable Development. 1997. *Eco-efficiency: The Business Link to Sustainable Development.* Cambridge, Massachusetts: MIT Press.

Ganzi and Dunn. 1995. *Global Survey on Environmental Policies and Practices of the Financial Services Industry*. United Nations Environment Programme.

Ganzi, John T., and Julie Tanner. 1996. *Global Survey on Environmental Policies and Practices of the Financial Services Industry: The Private Sector.* Washington, DC: National Wildlife Federation.

Ganzi, John, and Anne DeVries. 1998. *Corporate Environmental Performance as a Factor in Financial Industry Decisions*. Washington, DC: U.S. Environmental Protection Agency, Office of Cooperative Environmental Management.

Gentry, Bradford S., and Lisa O. Fernandez. 1997. *Valuing the Environment: How Fortune 500 CFOs and Analysts Measure Corporate Performance.* U.N. Development Programme, Office of Development Studies.

Kinsella, Susan et al. 1999. *Welfare for Waste: How Federal Taxpayer Subsidies Waste Resources and Discourage Recycling.* Athens, Georgia: GrassRoots Recycling Network.

Hart, Stuart. 1997. Beyond Greening: Strategies for a Sustainable World. *Harvard Business Review*. January–February.

Kiernan, Matthew, and Jonathan Levinson. 1998. Environment Drives Financial Performance: The Jury Is In. *Environmental Quality Management*. Winter 1997: 1–7.

Korsvold, Age, et al. 1997. *Environmental Performance and Shareholder Value.* World Business Council for Sustainable Development.

Muir, Warren W., and Malcom Forbes Baldwin. 1999. *Environmental Incentives.* Alexandria, Virginia: The Hampshire Research Institute.

Porter, Michael, and Claas Van Der Linde. 1995. Green and Competitive: Ending the Stalemate. *Harvard Business Review*. September–October.

PricewaterhouseCoopers. 1999. *UNEP Financial Institutions Initiative 1998 Survey*. United Nations Environment Programme.

Probst, Katherine, and Paul Portney. 1992. *Assigning Liability for Superfund Cleanups: An Analysis of Policy Options.* Washington, DC: Resources for the Future.

Ranganathan, Janet. 1998. *Sustainability Milestones: A State of Play in Sustainability Measurement and Reporting.* Washington, DC: World Resources Institute.

Reed, Donald. 1998. *Green Shareholder Value: Hype or Hit?* Washington, DC: World Resources Institute.

Reinhart, Forest, and Richard Vietor. 1989. *DuPont Freon Products Division (A: Classroom Case). Case No. 9389111*. Boston: Harvard Business School Press.

Resetar, Susan. 1999. *Technology Forces at Work: Profiles of Environmental Research and Development at DuPont, Intel, Monsanto, and Xerox*. Washington, DC: RAND Science and Technology Policy Institute.

Schmidheiny, Stephan, and Federico J. L. Zorraquin with the World Business Council for Sustainable Development. 1996. *Financing Change: The Financial Community, Eco-Efficiency, and Sustainable Development.* Cambridge, Massachusetts: MIT Press.

Singleton, Pamela, and Celeste Elia. 1998. *Interface, Inc. (Class A): Yet Another Record Quarter.* Merrill Lynch.

Skillius, Asa, and Ulrika Wennberg. 1998. *Continuity, Credibility and Comparability: Key Challenges for Corporate Environmental Performance Measurement and Communication.* European Environmental Agency.